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Non-Pharmacological Interventions in Preventive, Rehabilitative and Restorative Medicine

Andrés J. Ursa Herguedas

Abstract

Non-pharmacological interventions (NI) have been known since before modern pharmacology was developed. They occupy a prominent place in the healthcare sciences. The aim of this chapter is to show the role of NPI in medicine today. The reasons for implementing NPI, both in the scope of prevention and cure, are due to the fact that there are many diseases for which we still do not have a cure, such as Alzheimer's dementia, multiple sclerosis or fibromyalgia. By selecting those NPI that have more scientific evidence and applied by health or non-health personnel, it is intended to improve quality of life, slow down deterioration, relieve pain or restore health at a lower economic and environmental cost whilst complying with the Hippocratic maxim "first, do no harm". There are many NPI currently managed, which are used in most known conditions, to support specific treatment or as a single therapy. Further studies on NPI to improve their safety and efficacy are advisable.

Keywords: iatrogenesis, integrative medicine, non-pharmacological interventions, non-pharmacological treatments

1. Introduction

Non-pharmacological interventions (NPI) are part of the chapter on therapeutics in the health sciences. Together with pharmacotherapy, ionising or non-ionising radiation, surgery and rehabilitative medicine they comprise the procedures used to prevent and treat diseases.

Non-pharmacological treatments (NPT) are used for many unconventional treatments in integrative medicine.

The need to use NPI is justified because it is a valid option if indicated as a preventive or curative measure. Side effects of medications are avoided, health costs are brought down and there is no significant environmental impact.

The use of medicines has entailed an important change for humankind. No one doubts the benefits of antimicrobials, vaccines, anti-inflammatories, analgesics, opotherapy and specific medicines for each health problem. Modern surgery has been possible thanks to the development of anaesthetics, anticoagulants and a large

number of medicines that make it possible for each intervention to be performed. Many material and human resources have been devoted to the study of numerous drugs and a powerful pharmaceutical industry (PI) has developed which occupies the highest echelons in the economy of developed countries.

Although there are many benefits provided by PI and they continue to contribute to the health of humankind, a series of problems that have arisen due to the so-called medicalization of life must be taken into account [1].

Prescribing is far from being totally scientific and suffers from serious shortcomings for various reasons such as commercial interests, deficiencies in clinical trials and regulatory bodies, ethics and environmental problems. Sometimes as many medicines are prescribed as the client has symptoms, whereby it invites a follow-up for possible drug interactions and side effects [2].

Greater prescription of medicines (polypharmacy) is associated with poorer quality of life and higher morbidity. In some developed countries, iatrogenic drugs have displaced accidents as the third or fourth leading cause of death after cardiovascular disease and cancer [3].

The criteria of the prescribing physician, whether primary or specialised care, is important to avoid interactions, overdose, duplicates and other problems that may contribute to the onset of side effects. In addition, the criteria must avoid pressures from the PI and act with a cost criterion; effectiveness, safety and environmental

PI performance	Consequences	Solutions
Most clinical trials (CT) are sponsored by the PI	Large percentage of positive results	Legislation and greater control
Negative results are not published	The scientific community is deprived of important information	It was approved that all clinical trials had to be registered (WHO, 2004) and/or Latin American Registry of CT in progress (Latinrec)
PI sometimes manipulates CT results	The user of the medicine is harmed by side effects, etc.	Greater control of clinical trials (legislation)
CT results are not always replicable	Concern	Legislation
Bioethics committees and regulatory bodies are not always up to the task	They evaluate efficacy, quality and safety but not the medicine's therapeutic value	Need for analysis by independent bodies
Sometimes medicines for adults are prescribed at paediatric age	Greater chance of side effects	Further information from the laboratory
CT are performed with the most disadvantaged population groups (homeless, illegal immigrants, Latin Americans, etc.)	Selection bias and uncertainty Ethics issues	Adequate legislation
There are conflicts of interest in the study	New medicines are approved without sufficient knowledge of side effects	Greater control by regulatory bodies
The PI distorts clinicians' beliefs and substitutes marketing for testing	Increase in pharmaceutical spending due to inappropriate medication	Information transparency
Criteria for approval of a new medicine are often ineffective	The user and health system are harmed	Adequate legislation

Table 1.
Irregular pharmaceutical industry practices (taken from Goldacre and completed by A. Ursa).

sustainability. Due to this latter aspect, NPI should be taken into account since, in principle, they are more environmentally sustainable than medicines.

Evidence-based medicine (EBM) is the current benchmark when it comes to performing a healthcare intervention. Its influence also extends to the design of clinical trials and their reporting.

Since the onset of the 21st century, independent scientists from multinational pharmaceutical companies have denounced the inappropriate practices of the PI. **Table 1** shows some of the irregular practices carried out by the PI for financial purposes, their consequences and solutions according to Ben Goldacre [4].

During the medical procedure, all health professionals when prescribing within the scope of their competence, must choose the best therapeutic option for their client, always bearing in mind the NPI. The reality, however, is different because the future doctor is educated in the prescription of drugs. Because the current medical paradigm requires rapid, accurate and symptomatic actions. However, the side effects of the medicines also need to be tackled. Because of this, a powerful PI has been developed with major economic interests, the medicine has been overvalued and research, development and innovation (RDI) are targeted at these interests and not at NPI [5].

The PI generally spends more on marketing and marketing of medicines than on research [6].

Although it is true that the whole process that entails the launch of a new medicine on the market is lengthy and expensive, the PI often opts for a false innovation. That is how “me too” drugs arrive on the market [7], molecules similar to others in use, enantiomers, racemic mixtures, etc. The PI brings out “me too” drugs when the end of their drug patents approaches. These novelties that are not such, are usually expensive, not superior to the old drugs and are a source of major revenues for the PI [8].

Table 2 shows some methods used by researchers to obtain favourable results in clinical trials according to Sackett, Oxman, Smith, Peiró and Peralta [9].

Methods used by the PI to obtain favourable results in CT
Contrast the effects of the drug with placebo and not with other drugs
Conduct a CT against a treatment known to be inferior
Compare the new drug with doses that favour the study drug over the reference drug
Not apply true uncertainty criteria
Perform CT too small to reveal differences from the competitor
Use multiple variables in the CT and select only those that provided favourable results for publication
Perform multicentre trials and select only those from sites that obtained favourable results for publication
Perform subgroup analyses and select only those that are favourable for publication
Present results most likely to impress. Relative risk reduction is often used instead of absolute risk
Selection of the population participating in the study inappropriately
Using inappropriate routes of administration of the reference drug
Use surrogate instead of clinically relevant variables
Delay publication and retention of data
Establish the primary endpoint at the end of the study
Mask side effects
Highlight data favourable to the funder and not publish unfavourable data

Table 2.
Methods used to obtain favourable results in clinical trials [9].

The PI only finances research projects most likely to yield positive results. This breaches the uncertainty principle that establishes that the patient should be included in a CT only if there is substantial uncertainty about which treatment will benefit them the most [9].

The publishers that own the medical journals where the CT are published depend on the PI, since drug advertising, special issues, reprints, etc. are a source of revenue [10]. If an author publishes an unfavourable criticism against a drug or PI, he runs the risk of not receiving income for the above concepts [9].

The fact that certain medicines are included in a clinical practice guide (CPG) is of major interest to the PI, since these guidelines are drawn up by experts for their use [11]. A study published in JAMA in 2002 found a high number of financial relationships between CPG experts and PI. Serious omissions were found in the declarations of conflicts of interest [9].

Conflicts of interest and potential biases in the publication of scientific-medical research have cast doubt on the credibility of the PI [9].

According to Peter Gotzsche, from the University of Gopenhagen and director of the Nordic Cochrane Centre, the PI “does not work to improve health, but to obtain the maximum benefits” and to do this “extorts, commits fraud, breaches legislation and lies” [3].

2. Non-pharmacological interventions in the health sciences

2.1 Concept and generalities

Non-pharmacological interventions (NPI) or non-pharmacological therapies (NPT) are defined as any non-chemical intervention, which is theoretically supported, targeted and replicable, performed on a patient or caregiver and potentially capable of obtaining a relevant benefit [12].

The adoption of a healthy lifestyle is perhaps the best NPI as it will contribute to better health, more life enjoyment and reduce, except for contingencies, health costs. Thus, the ideal place to recommend NPI, as a preventive and/or curative measure is Primary Health Care, in line with the Declaration of Alma Ata of 1978 [13] and ratified 40 years later in Astaná in 2018 [14].

A large number of the techniques used in physiotherapy such as massage, kine-sitherapy, etc., manual techniques (joint manipulations, chiropractic, etc.), various techniques used in psychotherapy, yoga, meditation, and others framed under the term non- conventional medical therapies (NCMT) such as acupuncture, moxibustion, homoeopathy, etc., belong to the NPT chapter. Many act by stimulating the body’s healing power, sometimes because they stimulate the production of biogenic amines, neuropeptides, stimulate natural defences, produce neuroprotection, etc., which contributes to homeostasis [15].

Although herbal medicine or treatment with medicinal plants forms part of the treatments used in NCMT, it is not included in this section since it deals with chemical substances. This does not mean that they should not be used but rather that it would be desirable to supplement NPT with medicinal plants of proven efficacy and safety. Homoeopathic preparations, however, do fall under the NPT heading, since after several dilutions the original substance is not observed.

NPT seek to relieve symptoms and improve quality of life, which is why they are widely used in the management of dementias, especially Alzheimer’s dementia, both in institutions and at home. Applied exclusively or in combination with drugs, they aim to slow down the course of the disease [16].

NPT should meet safety and efficacy standards [17] and for this, studies and meta-analyses have had to be performed for scientific validation, as required by evidence-based medicine according to Sackett et al. [18].

Unfortunately, there is not always a company or entity that finances many of these studies. Therefore, there are fewer studies published than those offered by the PI.

Although NPT are used above all in the field of Gerontology, in many other disciplines they also have both preventive and curative applications, either alone or in combination with other therapies.

2.2 NPT in the field of social and healthcare assistance

NPT began to be applied systematically for dementia, both in institutionalised patients (nursing homes, day care centres) and in their homes. The aim was to, alleviate these processes, since there is no curative treatment [19]. NPT in the field of social and health care are called psychosocial interventions (PSI).

In the 1980s, support programmes for caregivers of dementia patients, whether they were family members or individuals, needed to be performed. In recent years there has been a need to extend these programmes to professional caregivers [19].

Since the last century there have been several attempts to classify PSI. With regard to validating PSI in Alzheimer’s dementia, experts recommend basing their actions on systematic reviews and meta-analyses.

Alzheimer’s relatives’ patient associations consider the areas of intervention in terms of cognitive, functional, emotional and comprehensive aspects.

Some intervention programmes (IP) used in the field of Alzheimer’s disease are listed in **Table 3** according to Gárate Olazábal [20].

These interventions can be performed either individually or in groups. Those carried out individually are more effective.

Intervention programmes (IP)	Techniques	Person who applies it
IP focused on behaviour	Behavioural training Cognitive behavioural therapy	Psychologist
Environmental IP	Adaptation of physical space Adaptation of the social environment	Clinical assistants
IP focused on emotion	Montessori method Validation therapy Reminiscence Orientation to reality	Psychogeriatricians Occupational therapist Physiotherapist Nursing assistant
Cognitive stimulation programme	Art therapy Music therapy Aromatherapy Physical exercise Light therapy	Psychogeriatrician Occupational therapist Physiotherapist Nursing assistant
IP focused on stimulation	Massage Therapeutic touch	Physiotherapist
Other IP	Relaxation, acupuncture, animal therapy, etc.	Psychologist, doctor

Table 3.
Intervention programmes focused on Alzheimer’s disease (taken from Gárate Olazábal and completed by A. Ursa).

The Montessori-Based Dementia Programming (MBDP) method enables adults with dementia to be given tasks initially designed solely for children. Dr. Cameron Camp and the Myers Research Institute are pioneers in the MBDP system, which began to be used in the late 1990s. It is applied at advanced stages and consists of performing scheduled activities based on activities of daily life (ADL). To achieve this, he uses cognitive rehabilitation techniques such as task division, guided repetition, progression from simple to complex, and progression from concrete to abstract. When applied properly, it improves motor skills and basic functional abilities within a reasonable period of time (included in the Barthel index) [21].

Many other NPI can be performed in the social health field and as a first choice, for common pathologies such as insomnia [22], anxiety and stress [23], etc.

Support groups, education techniques and cognitive-behavioural training, counselling and case management, and prevention of physical and/or chemical restraints have been devised among other interventions to reduce the morbidity associated with caring for these patients [24]. This is for the caregiver, whether family or non-family, due to the major burden that falls upon them.

2.3 NPT in the cardiovascular system

Cardiovascular diseases (CVD) are the most common cause of mortality in Western countries and involve high health costs. Arteriosclerosis develops insidiously over many years and its clinical manifestations appear when the disease is advanced. The CVD burden has grown in recent decades, in parallel to an increased prevalence of risk factors such as obesity, smoking, type 2 diabetes mellitus and high blood pressure [25]. Prevention of CVD involves adopting a healthy lifestyle and intervening on biochemical modifiable factors, etc., by means of pharmacological and/or non-pharmacological treatments.

In recent years, a preventive strategy has been developed in clinical practice based on what is known as cardiovascular rehabilitation (CVR), which is defined according to the World Health Organisation as “the set of activities necessary to ensure people with cardiovascular diseases, an optimal physical, mental and social condition that allows them to occupy by their own means as normal a place as possible in society” [26]. A team of professionals is required to perform CVR, it has relatively little implementation and according to cost-effectiveness studies it is favourable [27].

The prevention of such common pathologies as arterial hypertension is based on dietary advice, practice of physical exercise appropriate to each situation [28], stress control, emotional management and avoiding both legal and illegal drugs.

Many other cardiovascular diseases can be treated as first intention with NPT or as an accompaniment to pharmacological treatment. **Table 4** shows some of these pathologies, NPT and the healthcare professional who applies this.

It would be desirable to implement cardiovascular pathology NPI in health systems to reduce the side effects of medication, polypharmacy, improve quality of life and reduce health costs.

2.4 NPT in the respiratory system

Chronic obstructive pulmonary disease (COPD) and asthma are common respiratory diseases and in many cases, they go undiagnosed, reduce quality of life and represent a high health cost.

NPT is essential in COPD patients. However, this treatment is sometimes not given adequate importance. Patients diagnosed with COPD should benefit from

Pathology	NPT	Professional who applies/ supervises this
Hypertension	Physical exercise (Briones Arteaga)	General practitioner/specialist
Acute heart failure [29]	Ventilation, ultrafiltration, mechanical circulatory support, myocardial revascularization, etc. [29]	Cardiologist and nursing staff
Venous insufficiency of the lower limbs [30]	Dietary advice, hydrotherapy, physical exercise (Schneider)	Physician/nurse/physical therapist
Primary arterial hypotension [30]	Dietary advice, hydrotherapy, physical exercise (Schneider)	Physician/nurse/physical therapist

Table 4.
Some CVD and their non-pharmacological approach.

comprehensive care services (CCS), which are an articulated set of standardised actions aimed at meeting the COPD patient’s health needs, considering the environment and particular circumstances. Pulmonary rehabilitation (PR) is one of the essential components of non-pharmacological treatment in COPD. NPT is used as an adjunct to drug therapy [31] and has been shown to improve functionality [32].

Table 5 shows the pulmonary rehabilitation plan according to the National Heart, Lung, and Blood Institute (INCPS) [33].

Many other actions have been published for asthma (therapeutic education, massage, music therapy, etc.). However, results are not conclusive.

2.5 NPT in the digestive system

Gastrointestinal tract diseases are numerous, due to different causes and many are related to an inappropriate lifestyle. In addition to the pharmacological and/or surgical, dietary and psychological treatment from which a benefit can be derived, some are susceptible to improvement with physical treatments such as different applications of hydrotherapy (washes, damp cloths plus drug substance, jets, etc.), physical exercise, relaxation techniques, etc., within the context of personalised medicine.

Table 6 shows some NPT applied in the most common digestive tract disorders (taken from Schneider and Pizzorno et al. [34, 35]).

In the section on hepatobiliary diseases, there are many accompanying measures to pharmacological, hygienic and dietary treatments that can be performed. Given the characteristics of the book, it is not possible to elaborate in this context.

2.6 NPT in endocrine-metabolic disorders

Obesity and diabetes mellitus are among the most common of the many endocrine-metabolic disorders in Western countries. Both constitute a public health problem since they cause major morbidity and mortality, which increases the country’s health expenditure. The first measure in tackling obesity consists of adopting a healthy lifestyle that enables maintaining an optimal weight. Diet, physical exercise and medical advice should not be lacking when the body mass index is higher than 30. Individualised treatment should take precedence over guidelines or protocols. In the case of type 2 diabetes mellitus, the most common, hygienic-dietary advice needs to be strengthened as an aid to pharmacological treatment if needed [36].

For dyslipidaemia, good results have been achieved with the application of cardio-healthy diets, especially for secondary dyslipidaemia [37].

Procedure	Purpose	Resources/professionals
Exercise training	Improve muscular endurance and strength	Treadmill, exercise bike, weights
Nutritional advice	Eating to achieve a healthy weight	Periodic supervision by the nutritionist
Health education	Knowledge of the disease, proposals for a healthy life, recognition of flare-ups, drug management, etc.	Specialist doctor/nursing team
Tackling fatigue	Advice on how to perform daily tasks, stress management, sleep, etc.	Specialist doctor/nursing team
Tips on breathing	Improve the quality of breathing and oxygenation	Specialist doctor/nursing team
Psychological advice	Individual or group approach. Avoid anxiety/depression	Psychologist

Table 5.
Pulmonary rehabilitation plan according to the INCPS.

Condition	NPT	Effects
Caries and periodontal disease	Mechanical cleaning of teeth with dental floss	Removes the bacterial plaque causing the disease
Gastroesophageal reflux esophagitis (from hiatus hernia, etc.)	Postural when lying down (head elevated) Physical exercise	Prevents passage of acid from the stomach
Chronic gastritis	Compresses, damp cloths plus drug substance, wraps, jets, etc. according to disease stage	Reduce discomfort, improve functionality
Gastrointestinal ulcer	Flax seed/clay plasters on abdomen, wraps and compresses for the first 4 weeks. After dry brushing of the skin, jets at alternate temperatures, etc.	Shortens course, relieves symptoms (pain, etc.) and reduces medication
Irritable bowel syndrome	Diet (fibre, etc.) Stress reduction (yoga, meditation) Physical exercise	Improves annoying symptoms (pain, etc.)
Functional constipation (no organic cause)	Diet, physical exercise, hydration Warm sitz baths. Chamomile enema. Belly massage. Abdominal wraps, etc.	Adoption of a healthy lifestyle improves the frequency of defecation and avoids associated diseases (haemorrhoids, etc.)
Haemorrhoids (internal and/or external)	Depending on scope they can benefit from a sitz bath at an alternating temperature, homoeopathy, etc.	Reduce congestion, relieve discomfort, etc.

Table 6.
NPT in some of the most common digestive tract diseases (taken from the book health by nature and natural medicine manual).

Physical exercise is the first indication in metabolic syndrome with the aim of reducing abdominal fat deposition and adverse cardiovascular effects. The remaining associated conditions are managed with medical advice, drug therapy, and a correct diet [38].

Bone mineral density (BMD) gradually decreases with age and is more evident in women when menopause begins. Physical exercise in conjunction with dietary and hygiene advice has been shown to improve BMD in postmenopausal women [39].

2.7 NPT in musculoskeletal disorders

Rehabilitation medicine and physiotherapy as members of the health sciences are the paradigm of NPT, since a large part of their actions are based on physical procedures.

Some symptoms and signs that accompany many osteoarticular, neurological, psychiatric and other diseases are the usually associated inflammation and pain. **Table 7** includes some procedures used in rehabilitation medicine and physiotherapy taken from Miranda Mayordomo [40].

The choice between heat and cold treatment is governed by principles and is sometimes applied empirically.

Heat provides transient relief in subacute and chronic inflammatory and traumatic disorders, such as sprains, muscle strains, fibrositis, tenosynovitis, muscle spasms, myositis, lower back pain, neck injuries, various forms of arthritis, arthralgia, neuralgia, etc. Heat increases blood flow, and helps relieve inflammation, oedema and exudates from connective tissue injuries. Heat can be applied either superficially (infrared, hot compresses, paraffin bath, hydrotherapy) or deep (ultrasound). The intensity and duration of physiological effects depend primarily on the temperature of the tissue, the rate of temperature rise, and the area treated [40].

Cold can help relieve muscle spasms, myofascial or traumatic pain and acute inflammation (sprain, low back pain, etc). As of a certain temperature, cold induces

Technique/procedure	Effect	Indications
Kinesitherapy in its different variants	Gain in strength and mobility	Various injuries of the locomotor system, neurological, etc.
Therapeutic exercise (active kinesitherapy)	Improved proprioception	Indicated in many osteoarticular processes/ injuries
Heat/Cold	Analgesia, etc.	See text below
Transcutaneous electrical stimulation (TENS)	Analgesia	Many musculoskeletal and other conditions (oncology, etc.)
Cervical traction	Analgesia	Cervical spondylosis, disc prolapse, cervical injuries, torticollis, etc.
Massage	Mobilises contracted tissues, relieves pain, reduces inflammation and induration in trauma	Sprains, muscle strain, contusion, peripheral nerve injuries, lower back pain, arthritis, peri-arthritis, bursitis, fibromyalgia, hemiplegia, paraplegia, tetraplegia, multiple sclerosis, cerebral palsy and amputation
Acupuncture	Analgesia	Conditions that present with acute or chronic pain
Homoeopathy	Analgesia, reduces inflammation and oedema in trauma	Sprain, painful shoulder, osteoarthritis, bursitis, epicondylitis, carpal tunnel syndrome, etc.

Table 7.
Some physical therapies used in rehabilitation/physiotherapy (taken from Miranda Mayordomo’s book, Medical Rehabilitation and completed by A. Ursa).

a certain local anaesthesia (cryotherapy). Cold is usually used for a few hours after a muscle or tendon injury, up until evaluation [40].

Hydrotherapy in rehabilitative medicine is used in many conditions. Stirred hot water stimulates blood flow and debrides burns and wounds. This treatment is performed in a Hubbar tank with water between 35.5°C and 37.7°C. Full immersion in water heated to between 37.7°C and 40°C can also help relax muscles and relieve pain. Hydrotherapy is particularly useful for range-of-motion exercises [41, 42].

Electrotherapy in rehabilitative medicine plays an important role in many locomotor system disorders, either exclusively or as a complement to other techniques [43].

The various areas of physiotherapy, such as paediatric, respiratory, pelvic floor, neurological or sports - with their preventive, curative and rehabilitative approach – tackle numerous conditions that I do not address given the characteristics of this chapter.

2.8 NPT in neuropsychiatry

Although pharmacological therapy has played an important role in psychiatric conditions since its introduction, sometimes it is difficult to comply with the therapy due to the disease itself, due to side effects or due to access to medication, either during hospitalisation or domiciliary care. Because of this, a series of non-pharmacological techniques and procedures to treat the most common neuropsychiatric pathologies have been developed. NPT in psychiatry should generally be used before drug treatment. However, the reality is usually different. **Table 8** reports some of the most frequent techniques and procedures used in the most common neuropsychiatric conditions, taken from various authors.

There are NPT for neurological conditions such as migraine, multiple sclerosis, Parkinson’s disease, etc., which have been implemented in recent years. These require further studies for their validation.

2.9 NPT in sense organ conditions

Among the eyeball conditions, the Bates method for improvement of vision without glasses is notable. This work was published for the first time in 1919 in the USA [53].

After several years of observation, Dr. William H. Bates (1860–1931), an American ophthalmologist, devised some exercises to restore normal vision in some eye problems and dispense with using glasses. He started from the hypothesis that

Condition	Technique/procedure	Author(s)
Anxiety	Cognitive-behavioural therapy [44], relaxation techniques [44], yoga [44], meditation [45], contact with nature [46]	Galve, Ursa Herguedas
Insomnia	Cognitive-behavioural therapy, physical exercise during the day, etc. [47] [48]	Díez González, et al., Baides Noriega et al.
Depression	Physical exercise [49], phototherapy [50]	Alonso López et al., Tuunainen et al
Cerebral palsy	Equestrian therapy [51]	Jiménez de la Fuente
Equestrian therapy	Music therapy [52]	Acebes de Pablo et al

Table 8.
Most common neuropsychiatric pathologies and non-pharmacological approach (compiled by A. Ursa).

Technique	Procedure	Effect
Oscillations	Rotate the trunk with the feet on tiptoes. The opposite heel lifts on every turn	?
Palming	Cover the eyes with the palms of the hands so that no light penetrates	Facilitates eye relaxation
Sunning	Look at the sun with closed eyes, alternating light and shadow	?
Neck rotation/ flexion-extension	Rotate the neck to both sides alternately and cervical flexion and extension	Activation of muscle chains
Shoulder movement	Roll shoulders in a clockwise and anticlockwise direction	Activation of muscle chains
Targeting exercise	Fix vision alternately at a near (outstretched arm) and distant point	The lens ligaments are exercised
Eyeball rotation back and forth	Clockwise and anticlockwise rotation	The eye muscles are exercised

Table 9.
Some Bates method exercises (taken from Roselló's book see well without glasses).

the tension caused by certain visual habits were the main cause of poor eye vision. This method helps patients become aware of use of their visual organ by means of a series of eye and non-eye exercises. **Table 9** shows some of these exercises according to Roselló [54].

The Bates method is indicated for all vision refractive problems such as myopia, astigmatism, hyperopia and presbyopia. It is contraindicated in the event of macular degeneration, eye infection or eyeball tumour [53].

In the last few years, the Bates method has been taught on postgraduate courses at some European universities and recommended by some ophthalmologists. However, there are detractors of the method [55].

3. Summary and conclusions

Although we cannot dispense with medicines, medical protocols and guidelines must be urgently reviewed. This is because most are based on medicines as a first line treatment option.

Bioethics committees in clinical trials should be comprised of independent staff. Conflicts of interest in scientific publications should be more closely monitored.

The acquisition of a healthy lifestyle must be promoted through Primary Healthcare, as part of a primary prevention programme.

Non-pharmacological treatments (NPT) are especially indicated for chronic diseases. However, many acute conditions can also benefit.

Numerous conditions of most bodily systems can be treated with NPT. Implementing this modality would contribute to reducing the adverse effects of medicines, bring healthcare expenditure down and lead to environmental sustainability.

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Author details

Andrés J. Ursa Herguedas^{1,2,3}

1 Institute of Integrative Medicine, Valladolid, Spain

2 Staff Lecturer (Healthcare Area) of the Spanish Regional Government of Castilla y León, Spain

3 Member of the Dr. Ramón y Cajal Illustrious Academy of Health Sciences, Madrid, Spain

*Address all correspondence to: ajursa@educa.jcyl.es

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